

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NO. 88-157

SITE CLEANUP REQUIREMENTS FOR:

INTERNATIONAL BUSINESS MACHINES
SAN JOSE
SANTA CLARA COUNTY

The California Regional Water Quality Control Board, San Francisco Bay Region (hereinafter called the Regional Board) finds that:

1. International Business Machines (IBM), hereinafter called the discharger, operates and owns a facility that manufactures data processing machines, including disk drives and mass storage systems, at 5600 Cottle Road in the City of San Jose, Santa Clara County (Attachment 1). Construction of the facility began in 1955 on land previously used for agricultural purposes. The facility has been in operation since December 1956.
2. The Regional Board adopted Waste Discharge Requirements in Order No. 84-90 on December 18, 1984 for the discharger's interim site remediation. The State Water Resources Control Board (hereinafter State Board) adopted Order No. WQ 86-8 which clarified the Regional Board Order and responded to appeals on Order No. 84-90. Order No. 84-90 was amended on March 16, 1988 by Regional Board Order No. 88-45. This Site Cleanup Requirement Order rescinds Orders No. 84-90 and 88-45. This Order sets tasks and submittal dates for final site remediation to be consistent with the Health and Safety Code and the National Contingency Plan.
3. At the facility, organic chemicals are and have been handled and stored in bottles, drums, above ground tanks, and under ground tanks. The discharger uses organic chemicals such as 1,1,1-trichloroethane (TCA), Freon 11, Freon 12, Freon 113, isopropyl alcohol (IPA), xylene, acetone, petroleum naphthas and other organic chemicals during the disk manufacturing process.
4. In October 1980, the discharger discovered TCA, petroleum naphtha and xylenes in soil during excavation of underground tanks and after confirming that a release of chemicals had occurred, reported the release to Regional Board staff. In November 1981, additional investigation revealed extensive ground water pollution and a

comprehensive site-wide investigation program was initiated as requested by Regional Board staff. Other releases of chemicals from the discharger were found, including a significant release of Freon 113. The discharger determined that the releases to soil and groundwater were due to tank and pipeline fitting failures, tank and sump overflows, spillage from drum handling, and other releases.

5. Groundwater investigation was conducted by the discharger in both the Santa Teresa Basin, where the facility is located, and the San Jose Plain, which is located northerly and downgradient of the Santa Teresa Basin (Attachment 2). Groundwater overdraft conditions are present in the Santa Teresa Basin. Edenvale Gap, located between Oak Hill and Edenvale Ridge is the geographic boundary and hydraulic connection between the Santa Teresa Basin and the San Jose Plain. The geology in the vicinity of the facility consists of alluvium extending below the ground surface to bedrock, a depth of more than 400 feet. The groundwater flows northwesterly from the site towards Edenvale Gap. The San Jose Plain geology consists of aquifer zones which are less continuous and thicker than the Santa Teresa Basin. The San Jose Plain alluvium may be more than 750 feet thick from the ground surface to bedrock.
6. The plume of volatile chemical organic chemicals laterally extends from the discharger's property to beyond Edenvale Gap. The area of the plume, known as the defined area, is defined to 3 ppb each of TCA and Freon 113 and extends from the discharger's property to near the intersection of Monterey Road and Capitol Expressway. Downgradient of the defined area and northerly of Edenvale Gap is the area referred to as the undefined area. No monitoring wells have been installed in the undefined area. Geologic information for the undefined area was obtained from well logs for water supply wells located in the undefined area. TCA and Freon 113 have been detected in private and municipal wells located in the undefined area at levels up to 2.8 ppb Freon 113 and up to 3.3 ppb TCA. These results, and the direction of groundwater flow in this area, suggest that the plume extends significantly beyond the defined area. Pursuant to the Health and Safety Code Sections 25356.1 (d) and 25356.3 (c), the discharger is the only identified or known responsible party associated with the defined area of the plume, which extends from the facility northerly to the Edenvale Gap.
7. The Regional Board found in Order No. 84-90, Finding 11 and the State Board, supported this finding in Order WQ No. 86-8, III.a., that the degradation in the undefined area would not unreasonably affect beneficial uses and no further remediation was consistent with the

maximum benefit to the people of the State; therefore, further plume definition was not required based on available information.

8. Fourteen water supply wells are known to exist as active or potentially active wells down gradient within the defined plume area. Three active wells are known to exist within 300 feet of the defined area plume boundary of 1 ppb Freon 113. Some of these public and private drinking water supply wells have been affected by the discharger's plume and are found to contain volatile organic chemicals (VOC's) below Department of Health Services drinking water action levels and Federal drinking water standards. In January 1983, one water supplier stopped regular service from its water supply wells and drinking water supply from some private wells was discontinued even though the highest levels of VOC's were below the Department of Health Services (DHS) Drinking Water Action Levels. Currently, as a result of clean-up measures undertaken by the discharger, nine drinking water wells monitored in the plume area have nondetectable concentrations at less than 0.5 ppb detection limits and four drinking water wells contain no more than 1.0 ppb of Freon and 0.4 ppb TCA. One well contains 20 ppb Freon and 9.0 ppb TCA. The remaining water supply wells are not accessible for monitoring by the discharger. None of the defined area water supply wells which are currently monitored contain more than 0.1 ppb 1,1-DCE. Eight water supply wells have been taken out of service and destroyed since the investigation began.
9. The discharger has installed more than 300 monitoring and extraction wells to aid in plume characterization, source control, and cleanup. At this time, the plume appears to be present in several aquifers and is adequately defined vertically. The plume measures more than three miles in length extending northwesterly from the discharger's property boundary past the intersection of Monterey Road and Capitol Expressway (Attachment 2) and is more than 180 feet in depth. Laterally, the plume is currently under significant hydraulic control. However, chemicals continue to migrate from shallow aquifers to deep aquifers which increases the concentrations of chemicals in the deeper aquifers.
10. The discharger may be required to perform additional plume characterization if monitoring results indicate that potential conduits may have transmitted chemicals to deeper aquifers. The discharger has identified several wells in the defined area which could be and have been potential conduits. These wells have been properly destroyed, are scheduled for destruction, or cannot be located.

11. Activities to prevent further chemical migration from the discharger's release areas include removal of the chemical storage tanks, excavation of soil containing chemicals and extraction of groundwater containing chemicals. Starting in 1981, the discharger removed sixty-five underground tanks and replaced some of the tanks with storage tanks in open vaults having double containment. The discharger has removed more than 23,000 cubic yards of soil containing chemicals from the release areas on site. Additional soil removal may require the demolition of existing buildings.
12. Interim remedial measures to cleanup the plume have included offsite and onsite groundwater extraction since November 1982. Operation of the extraction wells has minimized further plume migration, slightly reduced the size of the plume, and reduced chemical concentrations within the plume. However, localized areas of higher chemical concentrations within the plume may contribute to further interaquifer transfer via leaky aquitards and potential conduits. Due to declining groundwater level effects on the interim remediation, the Regional Board allowed the discharger to reduce extraction as ordered in Regional Board Order No. 88-45 which amended Order No. 84-90.
13. Pumping and recharge activities within the Santa Teresa Groundwater Basin by others affects vertical and lateral hydraulic gradients and may impact plume migration control at the IBM site and offsite. Furthermore, the overall imbalance in the hydrologic budget for the Santa Teresa Groundwater Basin is beyond the sole control of the discharger.
14. The extracted groundwater has been discharged under NPDES Permits, Regional Board Orders Nos. 83-37 and 83-39, with and without treatment to storm drains leading to Canoas Creek which is tributary to the Guadalupe River which flows into south San Francisco Bay. The Regional Board will combine these two orders and reissue a NPDES permit as part of this cleanup plan. Due to volatilization along the length of the storm drains, up to 8 ppb TCA and 6 ppb Freon enter Canoas Creek. Recharge from Canoas Creek may occur to a slight degree. The Guadalupe River provides significant recharge to shallow groundwater aquifers along its length. No additional investigation of Canoas Creek recharge is planned due to the very low concentrations of chemicals currently being discharged into the creek by the discharger and the insignificance of recharge in Canoas Creek.
15. The discharger submitted a comprehensive plan as required by Regional Board Order 84-90 and State Board Order WQ 86-8. This comprehensive plan is also consistent with the Health and Safety Code requirements for a final remedial action plan (RAP) and the National Contingency

Plan (NCP) requirements for a remedial investigation and feasibility study (RI/FS). This comprehensive plan contains a proposed final remediation plan, proposed remediation levels, a remediation alternatives evaluation, water conservation plan, contingency plans for short term sub-basin management, and a public health evaluation. The final remediation plan is conceptual and provides a basis for remedial design.

16. Pursuant to the South Bay Multi-Site Cooperative Agreement and the South Bay Ground Water Contamination Enforcement Agreement, entered into on May 2, 1985, (as subsequently amended), by the Regional Board, EPA and DHS, the Regional Board has been acting as the lead regulatory agency. DHS and EPA have reviewed and commented on the draft comprehensive plan submitted by the discharger. The initial draft comprehensive plan and its revisions have been available for public review from December 1, 1986. During the time that the IBM site was a proposed NPL site, investigation and cleanup was regulated based on CERCLA and Health and Safety Code requirements. Since June 21, 1988, the IBM site has been proposed to become a RCRA site and be dropped from consideration as a NPL site. The Regional Board will continue to regulate the discharger's remediation and enforce under CERCLA as amended by SARA.
17. The discharger evaluated six alternative cleanup plans: 1) monitoring only, 2) protection of beneficial uses at drinking water supply wells, 3) protection of beneficial uses within the aquifer, 4) aquifer protection with a safety factor (assuming stable groundwater levels 5) remediation to background levels, and 6) aquifer protection with safety factor (contingency plans based on variable groundwater levels). Based on the alternatives evaluated, the discharger recommended alternative 6, as a final remedial action plan. The objectives of the plan are: 1) protect public health and the environment, 2) be technically feasible and 3) be cost-effective. The discharger proposes to continue groundwater remediation off site to concentrations below health-based drinking water criteria. The discharger's proposed plan, as modified by this Order, is adequate to comply with the Specifications, Prohibitions, and Provisions of this Order.
18. On July 21, 1988, the State Board adopted Resolution No. 88-88 which required that IBM and Fairchild remediation plans must result in beneficial use of, or recharge to the Santa Teresa Basin, of a significant amount of extracted groundwater. If use or recharge of significant amounts is not proposed for the period after January 31, 1989, the discharger must fully justify reasons for not using or recharging the groundwater. The justification must also demonstrate

why continued pumping is necessary from the standpoints of public health, protection of potential and present beneficial uses, maintaining high quality water, and providing the maximum benefit to the people of the State.

19. The discharger has evaluated the feasibility of reusing the groundwater resulting from the remediation activities. The discharger proposes to reuse the groundwater on site for shallow aquifer recharge, irrigation, and cooling tower water makeup flow and will optimize the reuse with a goal of reusing 100% of the total flow from on and off site. If an opportunity for additional reuse occurs, the discharger will evaluate that potential reuse based on the conditions set forth under the California Water Code Section 13550. The discharger proposes to treat off site groundwater by nozzles with no additional use prior to discharge to storm drains leading to Canoas Creek which flows into Guadalupe River to recharge shallow aquifers. Groundwater extraction and reuse may need to be modified in the future based on management of the basin and on the inherent uncertainties of yearly rainfall amounts and based on the performance evaluation to be conducted every five years after this order is adopted. Use of the treated groundwater for irrigation and recharge via injection wells shall be regulated pursuant to another Regional Board order.

The Regional Board intends to strongly encourage, and require to the extent allowed by law, the maximum reuse of extracted groundwater feasible either by the discharger or other public or private water users. Groundwater extracted from the Edenvale Gap should receive the highest priority of all offsite extraction for reuse consideration.

20. The discharger has based its evaluation of remediation alternatives and remediation levels on the Hazard Index concept. Hazard Indices have been calculated for both possible noncarcinogenic effects (NCHI) and possible carcinogenic effects (CHI). A NCHI value less than 1.0 indicates that all of the chemicals of interest found in B and deeper drinking water aquifers are present at concentrations equal to or below their relevant drinking water criteria. A CHI value of 1.0 indicates a maximum possible one in a million cancer risk from drinking two liters of water directly from the aquifer for 70 years. Department of Health Services (DHS) and the EPA have reviewed the discharger's proposed use of Hazard Indices and found that the indices appear to be justified for drinking water based on available data. These values may increase or decrease based on possible future changes in action levels or other safe drinking water standards for these pollutants.

From a public health threat perspective, the primary exposure route from the discharger's contamination is through ingestion of contaminated water. Based upon 1986 data, the maximum cancer risk due to potential consumption of untreated water from the A-aquifer zone is approximately 8×10^{-5} which a CHI of 80.0. This calculation assumes a worst case scenario in which a person weighing 70 kilograms drinks 2 liters of water daily directly from the A-aquifer zone in the IBM site over a 70 year period. Similarly, the contamination associated with non-carcinogen adverse health effects in the A-Aquifer zone on-site significantly exceed relevant drinking water criteria, with a maximum NCHI of 71.3. The A-aquifer zone does not currently supply drinking water and IBM installed institutional controls to prevent future exposure to A-aquifer zone water. Contamination on-site migrating downward to the lower drinking water aquifer warrants A-aquifer remediation.

21. On October 28, 1968, the State Board adopted Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality Waters in California". This policy calls for maintaining the existing high quality of State waters unless it is demonstrated that any change would be consistent with the maximum public benefit and not unreasonably affect beneficial uses. This is based on a Legislative finding, contained in Section 13000, California Water Code, which states in part that it is State policy that; "waters of the State shall be regulated to attain the highest water quality which is reasonable". The original discharge of wastes to the groundwater at this site was in violation of this policy; therefore, the groundwater needs to be restored to its original high quality to the extent reasonable. Based on available information, as found in the discharger's technical reports "Draft Comprehensive Plan" dated June 1987 and revised October 1987 and "Draft Comprehensive Plan Supplement" dated April 1988 and revised July 1988, the change in water quality does not unreasonably affect beneficial uses and is consistent with the maximum public benefit as defined in State Board Resolution No. 68-16. This limited degradation would not exceed any established water quality policies; the remediation water quality levels proposed are well below current applicable health criteria; and the levels do restore the quality of the groundwater to the extent reasonable given technical and economic constraints. These constraints include the high additional incremental costs for removal of small amounts of additional pollutants and the need to minimize the removal of groundwater to achieve acceptable cleanup levels.
22. The remediation level for the B and deeper aquifers is 0.25 NCHI and 1.0 CHI as well as one fourth the noncarcinogen drinking water action level or health criteria for each non-carcinogen and the one in one

million risk concentration for each carcinogen. The level for the transmissive areas of the A aquifer is the drinking water action level or health criteria for each chemical. These remediation levels are at or below drinking water health criteria, action levels, and standards and will assure preservation of beneficial uses by maximizing the quality of groundwater to the maximum extent feasible. The soil remediation goal is 1 ppm for each pollutant; a goal is set due to the technical uncertainties associated with remediation of soil by means other than excavation which is no longer feasible due to prohibitive cost. These remediation levels may be attained within ten to twenty years. This goal will be re-evaluated based on chemical leachability test results for the soil and evaluation of pilot and full scale remediation efforts.

23. Based on historic water quality data for monitoring wells upgradient of and near Edenvale Gap, chemical concentrations are not expected to significantly increase in water supply wells in the undefined area. Remediation levels would be similar to concentrations (approximately 30 ppb each TCA and Freon) which flowed through Edenvale Gap and into the undefined area prior to plume interception during interim remediation. Concentrations in the Edenvale Gap wells will not be allowed to increase above 30 ppb each for TCA and Freon or 0.6 ppb 1,1-DCE.

In order to assure effective verification monitoring of groundwater leaving the defined area through the Edenvale Gap, a continuously pumping well needs to be monitored. This well must be screened in at least the B and C aquifers. The well must be located, and pumped at sufficient volume, to assure a capture zone representative of the groundwater passing through the Edenvale Gap.

24. If new information indicates remediation levels cannot be reasonably attained or can be reasonably surpassed, the Regional Board will decide if further final remediation actions beyond those completed shall be implemented at this site, based to a significant degree on the information developed pursuant to this Order. In accordance with the State Board Order No. 86-90 requirements, the Regional Board will base its decision on an evaluation of monitoring data obtained after temporary shutdown of extraction wells prior to permanent abandonment of extraction wells. If changes in health criteria, administrative requirements, site conditions, or remediation efficiency occur, the discharger will submit an evaluation of the effects of these changes on remediation levels specified in Specification B.3, 4 and 6 and on Table 1 and 2 of this Order.

The Regional Board recognizes that the discharger has already performed extensive investigative and remedial work onsite and offsite; and that the discharger is being ordered hereby to perform substantial additional remedial tasks. It is in the public interest to have the discharger undertake such remedial actions promptly and without prolonged litigation or the expenditure of public funds. The Board recognizes that an important element in encouraging the discharger to invest substantial resources in undertaking such remedial actions is to provide the discharger with reasonable assurances that the remedial actions called for in this Order will be the final remedial actions required to be undertaken by the discharger. On the other hand, the Board also recognizes its responsibility to protect water quality, public health, and the environment and that future developments could indicate that some additional remedial actions may be necessary. The Board has considered and balanced these important considerations, and has determined that the remedial actions ordered herein represent the Board's best, current judgment of the remedial actions to be required of the discharger. The Board will not require the discharger to undertake additional remedial actions with respect to the matters previously described herein unless: (1) conditions on the site, previously unknown to the Board, are discovered after the adoption of this Order, or (2) new information is received by the Board, in whole or in part after the date of this Order, and these previously unknown conditions or this new information indicates that the remedial actions required in this Order may not be protective of public health and the environment. The Board will also consider technical practicality, cost effectiveness, State Board Resolution No. 68-16 and the other factors evaluated by the Board in issuing this Order in determining whether such additional remedial actions are appropriate and necessary.

25. In accordance with the Health and Safety Code Section 25356.1, Section 121 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) this final remedial action plan is equivalent to a feasibility study, satisfies the requirements of the California Water Code Section 13304 and is protective of human health and the environment, attains Applicable or Relevant and Appropriate Requirements (ARARs), utilizes permanent solutions and alternative treatment technologies and resource recovery technologies to the maximum extent possible for short term effectiveness, is implementable, is cost effective, is acceptable based on State regulations, policies, and guidance, and reduces toxicity, mobility, and volume of pollutants, and addresses public concerns.

26. The Board adopted a revised Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) on December 16, 1986. The Basin Plan contains water quality objectives and beneficial uses for South San Francisco Bay and contiguous surface and groundwaters.
27. Development of this final remediation action plan was based on the Regional Board's evaluation of seven years of water and soil quality data. Random samples have been collected and analyzed by the Regional Board to confirm the validity of data generated by the discharger. However, the data has not yet been validated using EPA validation guidance. The quality of this data has been taken into consideration and has been used in a manner consistent with the data's quality.
28. The existing and potential beneficial uses of the groundwater underlying and adjacent to the facility include:
 - a. Industrial process water supply
 - b. Industrial service water supply
 - c. Municipal and domestic water supply
 - d. Agricultural water supply
29. The discharger has caused or permitted, and threatens to cause or permit, waste to be discharged or deposited where it is or probably will be discharged to waters of the State and creates or threatens to create a condition of pollution or nuisance. Onsite and offsite final containment and remediation measures need to be implemented to alleviate the threat to the environment posed by the plume of pollutants.
30. This action is an order to enforce the laws and regulations administered by the Board. This action is categorically exempt from the provisions of the CEQA pursuant to Section 15321 of the Resources Agency Guidelines.
31. The Board has notified the discharger and interested agencies and persons of its intent under California Water Code Section 13304 to prescribe Site Cleanup Requirements for the discharge and has provided them with the opportunity for a public hearing and an opportunity to submit their written views and recommendations.
32. The Board, in a public meeting, heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED, pursuant to Section 13304 of the California Water Code, that the discharger shall cleanup and abate the effects described in the above findings as follows:

A. PROHIBITIONS

1. The discharge of wastes or hazardous materials in a manner which will degrade water quality or adversely affect the beneficial uses of the waters of the State is prohibited.
2. Further significant migration of chemicals above remediation levels, as described in Findings 22 and 23, through subsurface transport to waters of the State is prohibited.
3. Activities associated with the subsurface investigation and cleanup which will cause significant adverse migration of chemicals are prohibited.

B. SPECIFICATIONS

1. The storage, handling, treatment or disposal of soil or groundwater containing chemicals shall not create a nuisance as defined in Section 13050(m) of the California Water Code.
2. The discharger shall conduct monitoring activities as needed to define the current local hydrogeologic conditions, and the lateral and vertical extent of soil and groundwater containing chemicals. Should monitoring results show evidence of plume migration above remediation levels as described in Findings 22 and 23, additional plume characterization may be required.
3. Final remediation levels for chemical concentrations in any B or deeper aquifer well containing chemicals from the discharger's facility, shall be equal to or less than its Table 1 concentration and equal to or less than a NCHI of 0.25 and a CHI of 1.0.

The NCHI is calculated as shown using denominator values as listed in Table 3.

$$\sum_{i=1}^n \frac{(\text{actual concentration of each chemical in ppb})}{(\text{each chemical's Table 3 concentration in ppb})}$$

The CHI is calculated as shown using denominator values as listed in Table 4.

$$\sum_{i=1}^n \frac{(\text{actual concentration of each chemical in ppb})}{(\text{each chemical's Table 4 concentration in ppb})}$$

Chemical concentrations shall not be found to equal or exceed Table 1 concentrations based on the moving annual average of analytical results as determined at the end of each quarter.

If the moving annual average in any quarter increases by 50% relative percent difference (RPD) from the previous quarter, which will be considered a baseline quarter, then the discharger shall inform the Regional Board of such an increase. After the first quarter following the baseline quarter, the second quarterly average is still 50% RPD above the baseline quarter and the concentrations are above final remediation levels, then a threatened violation is present and the discharger shall inform the Board of the causes of this threatened violation. If the third quarterly average is an increase of 50% RPD from the baseline quarter and concentrations are above final remediation levels then the discharger shall be considered to be in violation of this order and shall inform the Board of how and when the discharger will regain compliance.

If quarterly average concentrations increase above 30 ppb each of Freon-113 and TCA or 0.6 ppb 1,1-DCE, in wells ORBC-2, ORBC-3, 35-BC, 36-BCD, 37-BC, 40-BC, 38-BC, 39-BC, and 44-BC, the discharger shall inform the Regional Board of how and when the discharger will regain compliance.

4. Final remediation levels for each chemical concentration in the transmissive areas of the A aquifer shall be equal to or less than each chemical concentration as listed in Table 2.
5. The discharger shall optimize, with a goal of 100%, its use of the groundwater extracted from its groundwater cleanup activities to aid the cleanup and reduce the effect of water level declines.
6. The discharger shall remediate soil to a goal of 1 ppm for each chemical. This goal may be modified by the Regional Board if the discharger demonstrates with site specific data that higher levels of chemicals in the soil will not threaten the quality of waters of the State.

7. Compliance points shall be established at all monitoring wells which at any given time are outside the 0.25 NCHI and 1.0 CHI plume boundary.
8. The discharger shall maintain extraction wells ORBC-2 and ORBC-3 in operable condition until the remediation levels are attained throughout the entire plume area.
9. The discharger shall implement the final Remedial Action Plan described in Finding 17, as modified by this Order.
10. Interpretation of all the above specifications shall recognize the inherent constraints placed on the discharger's ability to control groundwater levels, and potential migration of chemicals of concern due to pumping by other groundwater users and the apparent hydrologic imbalance in the Santa Teresa Groundwater Basin. However, the discharger shall comply with this Order to maximum extent feasible.

C. PROVISIONS

1. The discharger shall submit to the Board acceptable monitoring program reports containing results of work performed according to a program prescribed by the Board's Executive Officer.
2. The discharger shall comply with this Order immediately upon adoption with the exception that the discharger shall comply with Prohibitions A.1., A.2., and A.3. and Specifications B.1., B.2., B.3., B.4, B.5., B.6., B.7., B.8. and B.9. above, in accordance with the following tasks and compliance time schedules:

- a. COMPLETION DATE: December 15, 1988

TASK 1 - EDENVALE GAP WELL MONITORING

Submit a technical report acceptable to the Executive Officer demonstrating effective monitoring of groundwater passing through the Edenvale Gap. This report shall at a minimum specify for an existing or proposed well, the well's location, screened interval, pumping rate, anticipated capture zone and proposed monitoring schedule. If a new well(s) is proposed, an installation and monitoring time schedule shall be included. The Executive Officer shall amend the Self-Monitoring Program attached to this Order to indicate when monitoring shall begin and its frequency.

- b. COMPLETION DATE: December 15, 1988

TASK 2 - GROUNDWATER USE PLANS

Submit a technical report acceptable to the Executive Officer which contains a description of the groundwater use plans associated with the final remediation plan. The report shall include documentation of efforts to secure users for the water, reasons why potential users would not accept the water, and justification for why the pumped water cannot be used for beneficial uses or returned to the Basin. The technical report shall demonstrate how groundwater extracted from the Edenvale Gap will be reused, including specific uses and time schedules for implementation.

- c. COMPLETION DATE: July 17, 1989

TASK 3 - IN SITU VAPOR EXTRACTION PILOT STUDY EFFECTIVENESS AND FULL SCALE PROPOSAL

Submit a technical report acceptable to the Executive Officer which contains an evaluation of the effectiveness of in situ vapor extraction pilot studies conducted in source areas on site. This evaluation shall address the feasibility of achieving the soil remediation goals as set forth in Specification 6 of this Order.

- d. COMPLETION DATE: July 17, 1989

TASK 4 - "A" AQUIFER EXTRACTION WELL PILOT STUDY RESULTS AND PROPOSED BOUNDARY AND OFFSITE LOCATIONS

Submit a technical report acceptable to the Executive Officer which contains a description and results of the A aquifer extraction well pilot study and a remedial design proposal for full scale A aquifer extraction well locations. The report shall contain an evaluation of capture zone confirmation for each extraction well and a proposal for installation of extraction, piezometric, and monitoring wells. This report shall also include a Sample Plan which proposes well location, construction, development and monitoring schedule.

- e. COMPLETION DATE: August 21, 1989

TASK 5 - ON SITE GROUNDWATER UTILIZATION

Submit a technical report acceptable to the Executive Officer which contains an evaluation of the irrigation,

cooling tower, and lake water use patterns and proposed use of extracted groundwater, including a projected range of volume, location, application, and seasonal rate of groundwater usage.

- f. COMPLETION DATE: August 21, 1989

TASK 6 - CRITERIA FOR DECISION ANALYSIS OF FINAL PLAN
IMPLEMENTATION AND CONTINGENCY PROPOSAL

Submit a technical report acceptable to the Executive Officer which contains criteria used to determine which plan, either the Remedial Action Plan (RAP), Contingency 2, or Contingency 1, shall be initially implemented as described in the discharger's "Draft Supplement Comprehensive Plan". These criteria shall be based on saturated thickness, rate of decline or rate of recovery of groundwater levels basin hydrologic balance within a range of storage or overdraft values, and the trend in stability of water levels at or near the site.

- g. COMPLETION DATE: April 20, 1990

TASK 7 - "A" AQUIFER BOUNDARY AND OFF SITE EXTRACTION WELL
INSTALLATION

Submit a technical report acceptable to the Executive Officer which contains a description of construction and implementation of the A aquifer boundary and off site wells.

- h. COMPLETION DATE: February 19, 1992

TASK 8 - FINAL PLAN CONSTRUCTION COMPLETION

Submit a technical report acceptable to the Executive Officer which describes the construction and implementation of the final remedial action plan.

- i. COMPLETION DATE: October 19, 1993

TASK 9 - FIVE YEAR STATUS REPORT AND EFFECTIVENESS
EVALUATION

Submit a technical report acceptable to the Executive Officer containing the results of any additional investigation; an evaluation of the effectiveness of installed final remedial measures and remediation costs; additional recommended measures necessary to achieve final cleanup objectives; a comparison of previous expected costs

with the costs incurred and projected costs necessary to achieve remediation levels and goals; and the tasks and time schedule necessary to implement any additional final remedial measures. The evaluation shall include, but need not be limited to, an estimation of the flow capture zone of the extraction wells, establishment of the cones of depression by field measurements, and presentation of chemical monitoring data. This report shall also describe the use of extracted groundwater and evaluate and document the removal and/or cleanup of polluted soils, if such removal and/or cleanup is an element of the remedial measures. In addition to regular groundwater monitoring data, on site soil samples shall also be collected, analyzed, and leachability tests performed to determine the effectiveness of groundwater and soil air extraction on saturated and unsaturated soil located on the site.

- j. COMPLETION DATE: Two months after request by Executive Officer

TASK 10- "B" AND DEEPER AQUIFER EXTRACTION WELL INSTALLATION PROPOSAL

Submit a technical report acceptable to the Executive Officer which contains proposed extraction well locations in order to comply with Prohibition A.1., A.2., and A.3. and Specifications B.3.

- k. COMPLETION DATE: one month after the end of each study

TASK 11 - ADDITIONAL PILOT STUDIES

Submit a technical report acceptable to the Executive Officer which contains a description of pilot study results, an effectiveness evaluation of the pilot study, a description of the methodology and basis of the pilot study approach and all other supporting information, in addition to field notes and laboratory originated data summary sheets.

- l. COMPLETION DATE: two months after request made by the Executive Officer

TASK 12 - EVALUATION OF NEW HEALTH CRITERIA

Submit a technical report acceptable to the Executive Officer which contains an evaluation of how the final plan and cleanup levels would be affected, if the concentrations, as listed in Specification B.3., Tables 3 and 4 and used to

calculate Hazard Index numbers, change as a result of changes in source document conclusions or promulgation of drinking water standards or action levels.

- m. COMPLETION DATE: four months prior to proposed implementation of extraction curtailment

TASK 13 - WELL ABANDONMENT CRITERIA AND PROPOSAL

Submit a technical report acceptable to the Executive Officer which contains a proposal for abandoning groundwater extraction wells and the criteria used to justify well abandonment. The proposal shall include temporary curtailment of extraction well operation for an extended period of time to study the effects on pollutant migration prior to well abandonment. This report should identify the method, specific monitoring wells, and the basis for the time frame to be used to determine that final cleanup levels have been reached and that the potential for increases above remediation levels in concentrations is minimal. This report shall include supporting data for and an evaluation of water quality in areas believed to be remediated.

- n. COMPLETION DATE: 30 days after Regional Board approves curtailment.

TASK 14 - CURTAILMENT IMPLEMENTATION

Submit a technical report acceptable to the Executive Officer documenting completion of the necessary tasks identified in the technical report submitted for Task 13.

- o. COMPLETION DATE: 60 days after concentration increase is confirmed as provided in Specification 3.

TASK 15 - CONCENTRATION INCREASE EVALUATION AND RESPONSE PROPOSAL

Submit a technical report acceptable to the Executive Officer which contains an evaluation of the occurrence of concentration increases in extraction and monitoring wells as described in Specification B.3. In the event of noncompliance based on Specification B.3., the technical report shall contain an evaluation of the costs, benefits, and drawbacks of modifying active hydraulic cleanup and containment measures in comparison with a continued monitoring alternative. This technical report shall also include a proposal for a response to meet this Order's requirements.

- p. COMPLETION DATE: 30 days after the Board determines whether additional active measures are appropriate.

TASK 16 - RESPONSE IMPLEMENTATION

Submit a technical report acceptable to the Executive Officer which documents the implementation of the proposal in Task 15 which will be implemented should pollutant concentrations increase in extraction and monitoring wells as provided in Specifications B.3 and B.7.

- q. COMPLETION DATE: one month after release confirmation notification.

TASK 17 - PROPOSAL FOR REMEDIATION OF NEW RELEASES

Submit a technical report acceptable to the Executive Officer which contains a proposal for remediation of new releases onsite, and an implementation time schedule. This report shall evaluate the removal and/or cleanup of soil containing chemicals; evaluate alternative hydraulic control systems to contain and to remediate groundwater containing chemicals; shall be consistent with the final remediation plan and with the National Contingency Plan.

- r. COMPLETION DATE: two months after request by Executive Officer.

TASK 18 - EVALUATION OF NEW TECHNICAL INFORMATION

Submit a technical report acceptable to the Executive Officer which contains an evaluation of new technical and economic information which indicate that remediation levels in some plume areas may be considered for revision. Such technical reports shall not be required unless the Executive Officer or Board determines that such new information indicates a reasonable possibility that the Order may need to be changed under the criteria described in Finding 24.

3. The submittal of technical reports evaluating additional final remedial measures will include a projection of the cost, effectiveness, benefits, and impact on public health, welfare, and environment of each alternative measure. If any additional remedial investigations or feasibility studies are found to be necessary, they shall be consistent with the guidance provided by Subpart F of the National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR Part 300), Section 25356.1 (c) of the California Health and Safety Code, CERCLA guidance documents, the State Board's Resolution No. 68-16, and this Order.

4. If the discharger is delayed, interrupted or prevented from complying with this Order or meeting one or more of the time schedules in this Order, the discharger shall promptly notify the Executive Officer. In the event of such delays or noncompliance, the Regional Board will consider modification of the time schedules established in this Order.
5. Monthly technical status letter reports on compliance with the Prohibitions, Specifications, and Provisions of this Order shall be submitted by the fifteenth of each month to the Regional Board commencing December 15, 1988 and covering the previous month. On a monthly basis thereafter, or as required by the Executive Officer, these reports shall consist of a report that, (1) summarizes work completed since submittal of the previous report, and work projected to be completed by the time of the next report, (2) identifies any obstacles of which the discharger is aware that may threaten compliance with the schedule of this Order and what actions are being taken to overcome these obstacles, and (3) includes, in the event of non-compliance with any Specification or Provision of this Order, written notification which clarifies the reasons for non-compliance and which proposes specific measures and a schedule to achieve compliance. This written notification shall identify work not completed that was projected for completion, and shall identify the impact of non-compliance on achieving compliance with the remaining requirements of this Order.
6. On a quarterly basis, or as required by the Executive Officer, monitoring reports shall include, but need not be limited to, updated water table and piezometric surface maps for all affected water bearing zones, and appropriately scaled and detailed base maps showing the location of all monitoring wells and extraction wells, and identifying adjacent facilities and structures. The self-monitoring plan for this Order may be changed, as needed, by the Executive Officer. Cross-sectional geological maps describing the hydrogeological setting of the site shall be provided in the first quarterly status report for each calendar year that this Order is in effect. If five or more new soil borings or wells are completed during any quarter, updated cross-sectional geological maps shall be provided in the quarterly report for that quarter.
7. All hydrogeological plans, specifications, reports, and documents shall be signed by or stamped with the seal of a registered geologist, engineering geologist or professional engineer.

8. All samples shall be analyzed by laboratories certified to perform analysis on Hazardous Materials or laboratories using approved EPA methods or an equivalent method acceptable to the Executive Officer. The discharger shall request laboratories to follow EPA guidance "Documentation Requirements for Data Validation of Non-CLP Laboratory Data for Organic and Inorganic Analyses" dated May 1988 for preparation of data validation packages when required by the Executive Officer. All laboratories shall maintain quality assurance/quality control records for Board review.
9. The discharger shall maintain in good working order, and operate, as efficiently as possible, any facility or control system installed to achieve compliance with the requirements of this Order.
10. Copies of all correspondence, reports, and documents pertaining to compliance with the Prohibitions, Specifications, and Provisions of this Order, shall be provided to the following agencies:
 - a. Santa Clara Valley Water District
 - b. Santa Clara County Health Department
 - c. City of San Jose
 - d. State Department of Health Services/TSCD
 - e. State Water Resources Control Board
 - f. U. S. Environmental Protection Agency, Region IX

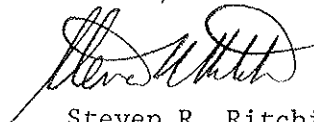
Additional copies of correspondence, reports and documents pertaining to annual reporting of compliance with the Prohibitions, Specifications, and Provisions of this Order shall be provided for public use when requested by the Executive Officer.

11. The discharger shall permit the Board or its authorized representative, in accordance with Section 13267(c) of the California Water Code:
 - a. Entry upon premises in which any pollution sources exist, or may potentially exist, or in which any required records are kept, which are relevant to this Order.
 - b. Access to copy any records required to be kept under the terms and conditions of this Order.
 - c. Inspection of any monitoring equipment or methodology

implemented in response to this Order.

- d. Sampling of any groundwater or soil which is accessible, or may become accessible, as part of any investigation or remedial action program undertaken by the discharger.
12. The discharger shall file a report on any changes in site occupancy and ownership associated with the facility described in this Order.
13. If any hazardous substance is discharged in or on any waters of the state, or discharged and deposited where it is, or probably will be discharged in or on any waters of the state, the discharger shall immediately report such discharge to this Regional Board, at (415) 464-1255 on weekdays during office hours from 8 a.m. to 5 p.m., and to the Office of Emergency Services at (800) 852-7550 during non-office hours. A written report shall be filed with the Regional within five (5) working days and shall contain information relative to: the nature of waste or pollutant, quantity involved, duration of incident, cause of spill, Spill Prevention and Containment Plan (SPCC) in effect, if any, estimated size of affected area, nature of effects, corrective measures that have been taken or planned, and a schedule of these activities, and persons notified.
14. The Board will review this Order periodically and may revise the requirements when necessary under the criteria in Finding 24.
15. Regional Board Order Nos. 84-90 and 88-45 are hereby rescinded.

I, Steven R. Ritchie, Executive Officer, do hereby certify that the foregoing is a full, true and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on October 19, 1988.



Steven R. Ritchie
Executive Officer

Attachments:

- TABLE 1 - Target Remediation Goals for the B- and Deeper Aquifer Zones
- TABLE 2 - Target Remediation Goals for the A-Aquifer Zone
- TABLE 3 - Concentrations Used as Denominators to Calculate
Hazard Indices Noncarcinogenic Effects
- TABLE 4 - Concentrations Used as Denominators to Calculate
Hazard Indices Possible Carcinogenic Effects
- SITE MAP

TABLE 1
TARGET REMEDIATION GOALS FOR THE B- AND DEEPER AQUIFER ZONES

<u>Chemical</u>	<u>Concentration (ppb)</u>	<u>Source of Goal</u>
Freon 113	4500	0.25 x DHS Action Level ¹
1,1,1-Trichloroethane	50	0.25 x DHS Action Level
1,1-Dichloroethylene	1.5	0.25 x DHS Action Level
1,1-Dichloroethane	5	0.25 x DHS Action Level
Freon 11	850	0.25 x DHS Action Level
Trichloroethylene	3.1	10 ⁻⁶ Risk Level ²
Chloroform	6.0	10 ⁻⁶ Risk Level
Methylene Chloride	4.8	10 ⁻⁶ Risk Level

¹Department of Health Services 1987a.

²Environmental Protection Agency 1987a.

TABLE 2

TARGET REMEDIATION GOALS FOR THE A-AQUIFER ZONE

Chemical	Concentration (ppb)	Source of Goal
Methylene Chloride	40	DHS Action Level ¹
Chloroform	6.0	DHS Applied Action Level
1,1-Dichloroethane	20	DHS Action Level
1,1,1-Trichloroethane	200	DHS Action Level
1,1-Dichloroethylene	6	DHS Action Level
1,2-Dichloroethylene	16	DHS Action Level
Trichloroethylene	5	DHS Action Level
Perchloroethylene	4	DHS Action Level
Freon 11	3,400	DHS Action Level
Freon 12	750	20% of EPA RfD ³
Freon 113	18,000	DHS Action Level
N-Methyl-2-Pyrrolidone	700	DHS Site Criteria ⁴
Isopropanol	450	DHS Site Criteria
Acetone	700	20% of EPA RfD
Ethyl Amyl Ketone	123	DHS Site Criteria
Shell Sol 140	1,000	DHS Site Criteria
Xylene	440	EPA Lifetime Health Advisory ⁵
Toluene	100	DHS Action Level
Benzene	0.7	DHS Action Level

¹California Department of Health Services 1987a.²California Department of Health Services 1986c.³Environmental Protection Agency 1987a. RfD denotes Reference Dose.⁴California Department of Health Services 1987b.⁵Environmental Protection Agency 1985b.

TABLE 3
CONCENTRATIONS USED AS DENOMINATORS TO CALCULATE HAZARD INDICES
NONCARCINOGENIC EFFECTS

<u>Chemical</u>	<u>Concentration (ppb)</u>	<u>Source of Estimate</u>
Chloroform	90	20% of EPA RfD ¹
Methylene Chloride (MC)	420	20% of EPA RfD
1,1-Dichloroethane (1,1-DCA)	20	DHS Action Level ²
1,1,1-Trichloroethane (1,1,1-TCA)	200	DHS Action Level
1,1-Dichloroethylene (1,1-DCE)	6	DHS Action Level
1,2-Dichloroethylene (1,2-DCE)	16	DHS Action Level
Trichloroethylene (TCE)	52	20% of EPA DWEL ³
Perchloroethylene (PCE)	136	20% of EPA DWEL
Freon 11	3,400	DHS Action Level
Freon 12	750	20% of EPA RfD
Freon 113	18,000	DHS Action Level
Toluene	100	DHS Action Level
Xylene	440	EPA Lifetime Health Advisory ⁴
N-Methyl-2-Pyrrolidone	700	DHS Site Criteria ⁵
Isopropanol	450	DHS Site Criteria
Acetone	700	20% of EPA RfD
Ethyl Amyl Ketone	123	DHS Site Criteria
Shell Sol 140	1,000	DHS Site Criteria

¹Environmental Protection Agency. 1987a. RfD denotes reference dose.

²Department of Health Services. 1987a.

³Environmental Protection Agency. 1985c.

⁴Environmental Protection Agency. 1985b.

⁵Department of Health Services. 1987b.

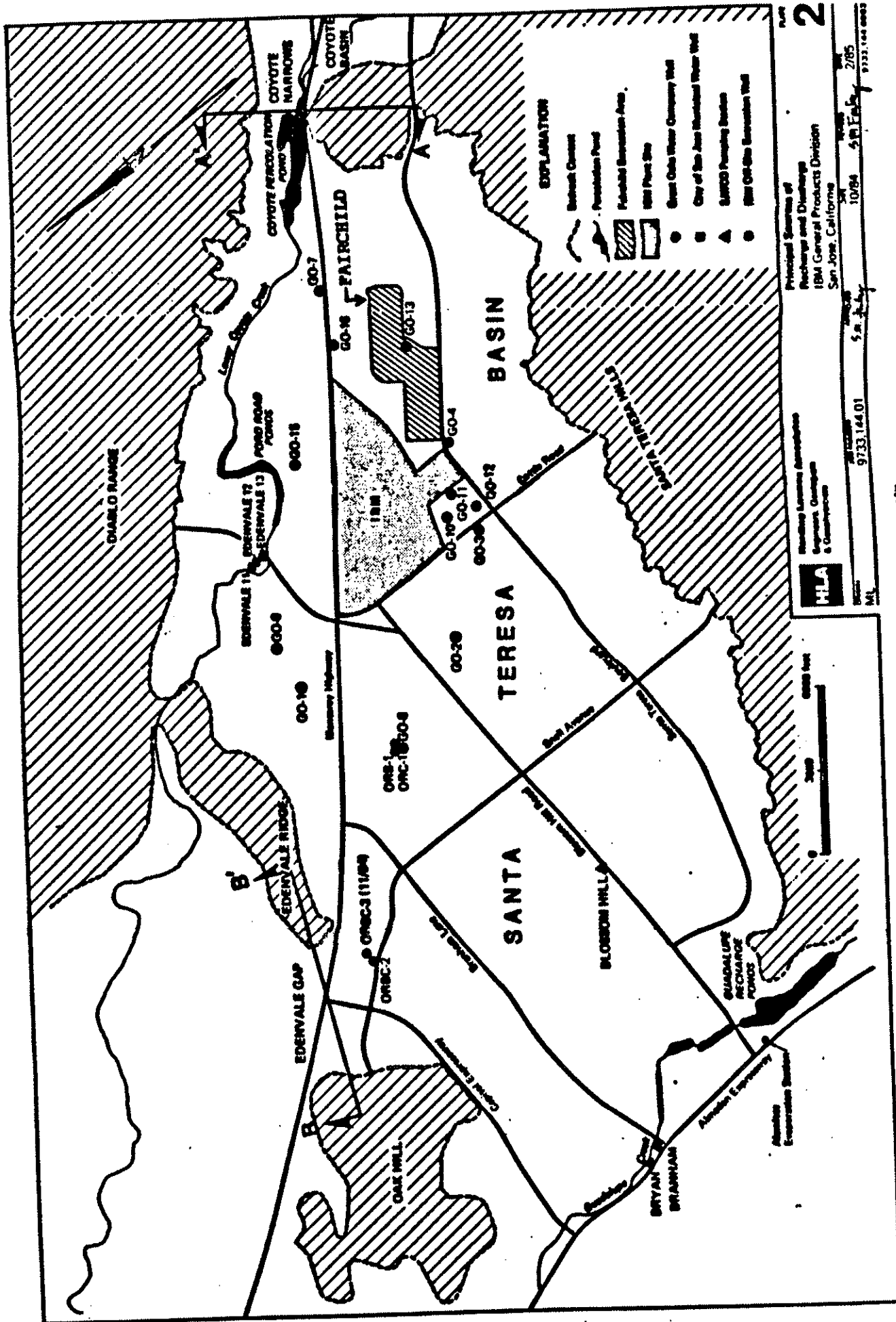
TABLE 4

CONCENTRATIONS USED AS DENOMINATORS TO CALCULATE HAZARD INDICES
POSSIBLE CARCINOGENIC EFFECTS

<u>Chemical</u>	<u>DR¹</u> <u>(ppb)</u>
Methylene chloride	4.8
Chloroform	6.0
Trichloroethylene	3.1
Perchloroethylene ²	0.67

¹DR is the concentration of a chemical in drinking water that is predicted to increase cancer risk by one case out of one million individuals consuming 2 liters of water per day for 70 years, U.S. EPA Integrated Risk Information System, April, 1987. These numbers are based on unit risk factors calculated by the EPA Carcinogen Assessment Group. They are theoretical upper bound risk calculations and do not represent measured cancer rates in humans or animals.

² The status of PCE is currently under review by EPA. It is included in this study as a B2 carcinogen.



SITE MAP

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

INTERNATIONAL BUSINESS MACHINES
GROUNDWATER SELF-MONITORING PROGRAM

A. GENERAL

Reporting responsibilities of waste dischargers are specified in Sections 13225(a), 13267(b), 13268, 13383, and 13387(b) of the California Water Code and this Regional Board's Resolution No. 73-16.

The principal purposes of a waste discharger's monitoring program, also referred to as a self-monitoring program, are: (1) To document compliance with waste discharge requirements and prohibitions established by this Regional Board, (2) To facilitate self-policing by the waste discharger in the prevention and abatement of pollution arising from waste discharge, (3) To develop or assist in the development of effluent or other limitations, discharger prohibitions, national standards of performance, pretreatment and toxicity standards, and other standards, and (4) To prepare water and wastewater quality inventories.

B. SAMPLING AND ANALYTICAL METHODS

Sample collection, storage, and analyses shall be performed according to the EPA Method 8000 series described in "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods", dated November 1986; or other methods approved and specified by the Executive Officer of this Regional Board.

C. REPORTS TO BE FILED WITH THE REGIONAL BOARD

1. Violations of Requirements

In the event the discharger is unable to comply with the conditions of the waste discharge requirements and prohibitions due to:

- a. maintenance work, power failures, or breakdown of waste treatment equipment, or
- b. accidents caused by human error or negligence, or
- c. other causes such as acts of nature, or
- d. poor operation or inadequate system design.

If the moving annual average in any quarter increases by a relative percent difference (RPD) of 50% from the previous quarter, which will be considered a baseline quarter, then the discharger shall inform the Regional Board of such an increase. After the first quarter following the baseline quarter, if the second quarterly average is still 50% RPD above the baseline quarter and the

concentrations are above final remediation levels, then a threatened violation is present and the discharger shall inform the Regional Board of the causes of this threatened violation. If the third consecutive quarterly average is still at an increase of 50% RPD from the baseline quarter and concentrations are above final remediation levels, then the discharger shall be considered to be in violation of this order and shall inform the Regional Board of how and when the discharger will regain compliance.

If quarterly average concentrations increase above 30 ppb each of Freon-113 and TCA or 0.6 ppb 1,1-DCE, in wells ORBC-2, ORBC-3, 35-BC, 36-BCD, 37-BC, 40-BC, 38-BC, 39-BC, and 44-BC, the discharger shall inform the Regional Board of how, and when the discharger will regain compliance.

If an increase of more than 10 ppb of either 1,1,1-trichloroethane (TCA), Freon-113 or more than 2.5 ppb 1,1-dichloroethene (1,1-DCE) occur in compliance point wells, the discharger shall increase sample collection and analysis in monitoring wells to be determined by the Executive Officer.

The increased monitoring will be according to the following:

1. weekly for wells sampled monthly
2. monthly for wells sampled bimonthly, quarterly, semiannually, annually or biannually

If chemical concentrations increase to more than the moving annual average, as determined at the end of each quarter, of the remediation levels, 0.25 noncarcinogen Hazard Index (NCHI), 1.0 carcinogen Hazard Index (CHI), or concentrations as listed in Tables 1 and 2, in wells which previously contained less than remediation levels, then the discharger shall notify the Regional Board office by telephone as soon as the discharger or the discharger's agent has knowledge of the incident. The discharger shall confirm this notification in writing within two weeks of the telephone notification. The written report shall include pertinent information explaining the reasons for noncompliance and shall indicate what steps were taken to prevent the problem from recurring.

The discharger shall file a written technical report at least 15 days prior to advertising for bid on any construction project which would cause or aggravate the discharge of waste in violation of requirements; said report shall describe the nature, costs and scheduling of all action necessary to preclude such discharge.

In addition, if the noncompliance caused by items (a), (b), (c) or (d) above is with respect to any of the Order's limits, the waste discharger shall promptly accelerate the monitoring program to weekly or as required by the Board's Executive Officer for those constituents which have been violated. Such analysis shall continue until such time as the effluent limits have been attained, or until such time as the Executive Officer determines to be appropriate.

The results of such monitoring shall be included in the regular Self-Monitoring Report.

2. Bypass Reports

Bypass reporting shall be an integral part of the regular monitoring program report. A report on bypassing of treatment units shall be made which will include cause, time and date, duration and estimated volume bypassed, method used in estimating volume, and persons and agencies notified. Notification to the Regional Board shall be made immediately by telephone (415-464-1255), followed by a written account within 15 days.

3. Self-Monitoring Reports

a. Reporting Period:

- (1). Written reports shall be filed regularly each quarter within forty-five days from the end of the quarter monitored.
- (2). Written monthly status report shall be filed regularly each month within fifteen days from the end of the previous month.

b. Letter of Transmittal:

A letter transmitting self-monitoring reports shall accompany each report. Such a letter shall include a discussion of requirement violations found during the reporting period and actions taken or planned for correcting any requirement violation. If the discharger has previously submitted a detailed time schedule for correcting requirement violations, a reference to this correspondence will be satisfactory. Monitoring reports and the letter transmitting reports shall be signed by either a principal executive officer or his duly authorized employee. The letter shall contain a statement by the official, under penalty of perjury, that to the best of the signer's knowledge the report is true and correct.

c. Data Results:

- (1). Results and Hazard Indices from each required analysis and observation shall be submitted in the quarterly self-monitoring regular reports. All chromatographic peaks for purgeable halocarbons and/or volatile organics shall be identified and quantified in the quarterly report, if a peak is identified in three consecutive samples. A GC/MS analysis shall be performed and all peaks identified and reported on each well according to Table 2 and on each new well immediately after installation and well development. Results shall also be submitted for any additional analyses performed by the dischargers at the specific request of the Board for parameters for which effluent limits

have been established and provided to the dischargers by the Board.

- (2). The monthly status report shall include a description of activities accomplished, planned, or attempted in order to meet the provisions of order No. 88- . This monthly status report shall include a discussion of reasons for delays in planned activities.
- (3). The quarterly report shall include a discussion of unexpected operational changes which could affect performance of the extraction system, such as flow fluctuations, maintenance shutdown, etc.
- (4). The quarterly report shall also identify the analytical procedures used for analyses either directly in the report or by reference to a standard plan accepted by the Executive Officer. Any special methods shall be identified and shall have prior approval of the Board's Executive Officer.
- (5). The discharger shall describe, in the quarterly report, the reasons for significant increases in a pollutant concentration at a well onsite. The description shall include:
 - 1). the source of the increase,
 - 2). how the discharger determined or will investigate the source of the increase, and
 - 3). what source removal measures have been completed or will be proposed.
- (6). Original lab results shall be retained and shall be made available for inspection for three years after origination or until after all continuing or impending legal or administrative actions are resolved.
- (7). A map shall accompany the quarterly report, showing sampling locations and plume contours for each chemical in each aquifer.
- (8). The discharger shall describe in the quarterly monitoring report the effectiveness of the actions taken to regain compliance if compliance is not achieved. The effectiveness evaluation shall include the basis of determining the effectiveness, water surface elevations for each well used to determine water surface elevation contours and water quality data.
- (9). The annual report shall be combined with the regular fourth calendar quarter report and shall include cumulative data for the current year for each parameter of the attached Table 1

and 2. The annual report for December shall also include average Hazard Indices and minimum, maximum, median and average water quality data for the year.

d. Self-Monitoring Program (SMP) Revisions:

Additional long term or temporary changes in the sample collection frequency and routine chemical analysis may become warranted as monitoring needs change. These changes shall be based on the following criteria and shall be proposed in a quarterly report. The changes shall be implemented no earlier than 45 days after a self-monitoring report is submitted for review or not at all if the proposal is found to be unacceptable by the Executive Officer.

Criteria for SMP revisions:

- (1). Discontinued analysis for a routine chemical parameter for a specific well after a one-year period of below detection limit values for that parameter.
- (2). Changes in sampling frequency for a specific well after a one-year period of below detection limit values for all chemical parameters from that well.
- (3). Temporary increases in sampling frequency or changes in requested chemical parameters for a well or group of wells because of a change in data needs (e.g., evaluating groundwater extraction effectiveness or other remediation strategies).
- (4). Add routine analysis for a chemical parameter if the parameter appears as an additional chromatographic peak in three consecutive samples from a particular well.
- (5). Add routine chemical parameters for new wells based on the results of initial GC/MS analysis.
- (6). Alter sampling frequency based on evaluation of collective data base.
- (7). Following a temporary increase in sampling frequency, as described in C.1., the regular sampling frequency will resume after 4 samples show stable or decreasing concentrations provided the sampling indicates compliance with the Site Cleanup Requirements (i.e. not increasing more than 50 percent RPD between samples).

D. DESCRIPTION OF SAMPLING STATIONS

Groundwater:

<u>Stations</u>	<u>Description</u>
Listed in TABLES 3 and 4	Monitoring, observation, extraction, and water supply wells.

E. SCHEDULE OF SAMPLING AND ANALYSIS

The schedule of sampling and analysis shall be as given in Tables 3 and 4.

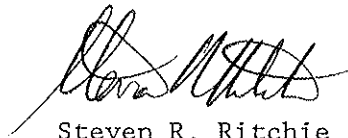
I, Steven R. Ritchie, Executive Officer, hereby certify that the foregoing Self-Monitoring Program:

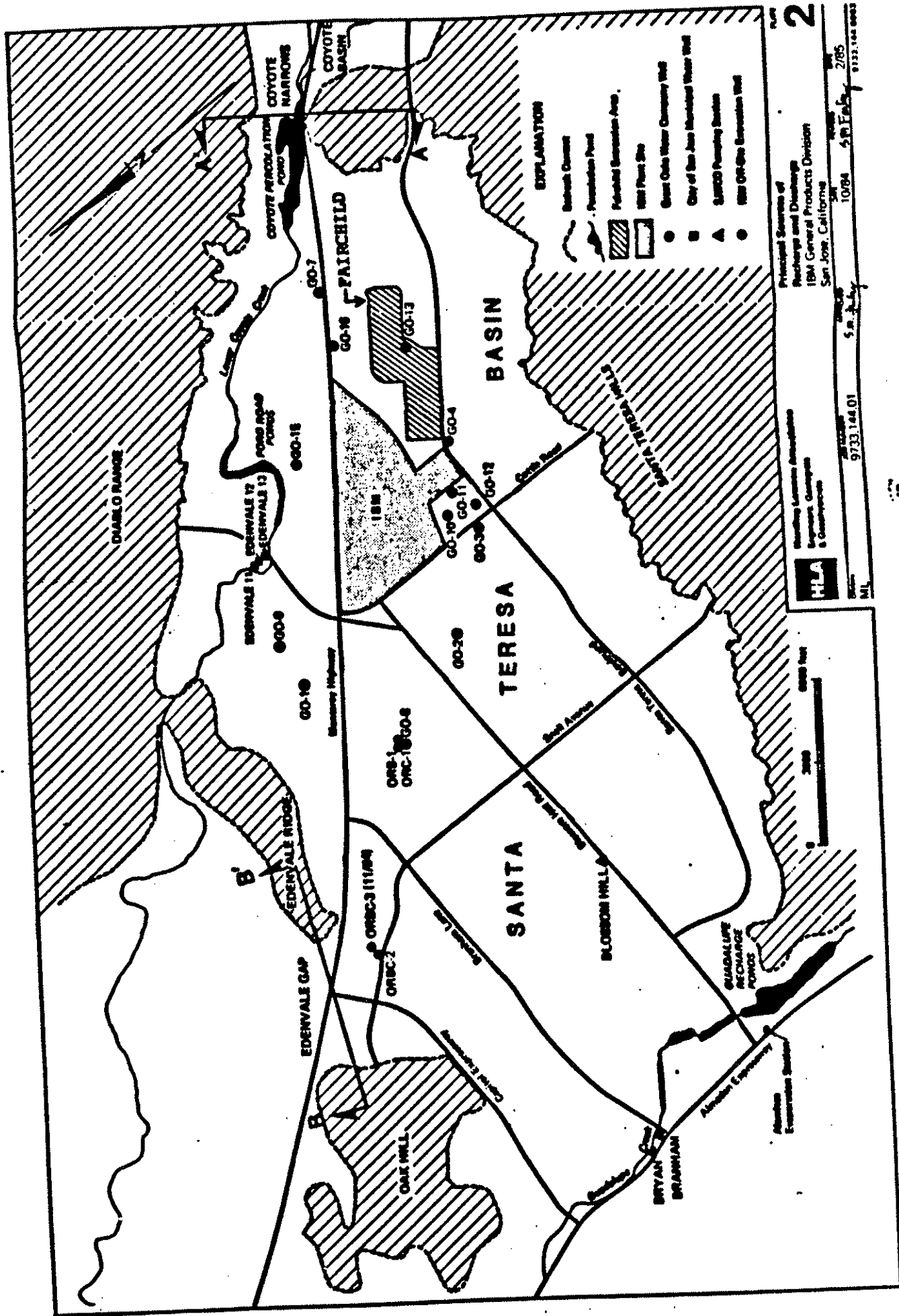
1. Has been developed in accordance with the procedure set forth in this Regional Board's Resolution No. 73-16 in order to obtain data to determine compliance with Regional Board Order No. 84-90 and Order No. 88-157, and State Board Order No. WQ 86-8.
2. Is effective on the date shown below.
3. May be reviewed at any time subsequent to the effective date upon written notice from the Executive Officer or request from the discharger and revisions will be ordered by the Executive Officer.

Effective Date:

10/20/88

Attachments: Tables 1,2,3,4

Steven R. Ritchie
Executive Officer



SITE MAP

TABLE 1
 TARGET REMEDIATION GOALS FOR THE B- AND DEEPER AQUIFER ZONES

<u>Chemical</u>	<u>Concentration (ppb)</u>	<u>Source of Goal</u>
Freon 113	4500	0.25 x DHS Action Level ¹
1,1,1-Trichloroethane	50	0.25 x DHS Action Level
1,1-Dichloroethylene	1.5	0.25 x DHS Action Level
1,1-Dichloroethane	5	0.25 x DHS Action Level
Freon 11	850	0.25 x DHS Action Level
Trichloroethylene	3.1	10 ⁻⁶ Risk Level ²
Chloroform	6.0	10 ⁻⁶ Risk Level
Methylene Chloride	4.8	10 ⁻⁶ Risk Level

¹Department of Health Services 1987a.

²Environmental Protection Agency 1987a.

TABLE 2

TARGET REMEDIATION GOALS FOR THE A-AQUIFER ZONE

Chemical	Concentration (ppb)	Source of Goal
Methylene Chloride	40	DHS Action Level ¹
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1,1,1-Trichloroethane	200	DHS Action Level
1,1-Dichloroethylene	6	DHS Action Level
1,2-Dichloroethylene	16	DHS Action Level
Trichloroethylene	5	DHS Action Level
Perchloroethylene	4	DHS Action Level
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Freon 12	750	20% of EPA RfD ³
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Acetone	700	20% of EPA RfD
Ethyl Amyl Ketone	123	DHS Site Criteria
Shell Sol 140	1,000	DHS Site Criteria
Xylene	440	EPA Lifetime Health Advisory ⁵
Toluene	100	DHS Action Level
Benzene	0.7	DHS Action Level

¹California Department of Health Services 1987a.²California Department of Health Services 1986c.³Environmental Protection Agency 1987a. RfD denotes Reference Dose.⁴California Department of Health Services 1987b.⁵Environmental Protection Agency 1985b.

Table 3. Sampling Schedule for GC/MS Analysis

Year 1

On-Site Wells

A-01, A-28, A-39, A-64, RA-2, RA-12, B-14, B-16, B-36, B-39, C-04

Off-Site Wells

1-B, 1-C, 1-DU, 1-DL, 9-B, 9-C, 9-D, 9-MD-186, 13-B, 13-C, 13-D,
15-B, 15-C, 33-BC, 38-BC, 38-D

Year 2

On-Site Wells

A-17, A-21, A-32, A-38, A-43, RA-14, B-04, B-11, B-21, B-42, C-1,
D-01

Off-Site Wells

8-CU, 8-CL, 18-B, 18-C, 19-BU, 19-BL, 19-C, 20-B, 20-C, 23-B,
23-C, 29-B, 29-C, 39-BC, 39-D

Year 3

On-Site Wells

A-11, A-13, A-20, A-41, A-71, A-72, B-02, B-22, B-23, B-41, C-11

Off-Site Wells

2-B, 2-C, 2-D, 5-B, 5-C, 7-BU, 7-BL, 7-C, 24-B, 24-C, 30-BC, 35-BC,
36-BCD, 46-BC, 47-D

TABLE 4 - Chemical Analyses Schedule for Ground Water Samples

Well No.	Frequency	Fre 113	ICA	ICE	1,1-DCE	1,1-DCA	Chloro	Other
ON-SITE MONITORING WELLS								
A-1	Q	X	X	X	X		X	S.Sol 140, Benzene, Tol, Xyl, Cr, Cr+6
A-2	Q	X	X		X			
A-3	(dry)							
A-4	BM							
A-5	(dry)	X	X					
A-6	--							Abandoned
A-7	(dry)							
A-8	--							Abandoned
A-9	BM	X	X	X				S.Sol 140, Benzene, Tol, Xyl
A-10	Q	X	X	X	X	X	X	PCE
A-11	Q	X	X	X				Redundant to A-61 (will not be sampled)
A-12	--							
A-13	Q	X	X	X				
A-14	BM	X	X		X			Abandoned
A-15	--							
A-16	(dry)							
A-17	Q	X	X	X	X	X	X	1,2-DCE, PCE, Pet Nap, S.Sol 140, Benzene, Tol, Xyl
A-18	Q	X	X	X	X	X		PCE, S.Sol 140, Benzene, Tol, Xyl
A-19	(dry)							
A-20	BM	X	X		X			
A-21	BM	X	X		X			
A-22	(dry)							
A-23	(dry)							
A-24	(dry)							
A-25	SA	X	X		X			Redundant to A-25 (will not be sampled)
A-26	--							

TABLE 4 - Chemical Analyses Schedule for Ground-Water Samples (continued)

Well No.	Frequency	Fre 113	ICA	ICE	1,1-DCE	1,1-DCA	Chloro	Other
A-27	(dry) BM	X	X	X	X	X	X	PCE, Chloro, S.Sol 140, Benzene, Tol, Xyl, Cr, Cr+6
A-28								Abandoned
A-29	--							
A-30	Q	X	X	X	X		X	
A-31	BM	X	X	X			X	
A-32	Q	X	X		X		X	S.Sol 140, Benzene, Tol, Xyl, Cr, Cr+6
A-33	(dry)							
A-34	(dry)							
A-35	(dry)							
A-36	(dry)							
A-37	(dry)							
A-38	Q	X	X		X			S.Sol 140, Benzene, Tol, Xyl
A-39	Q	X	X	X	X	X	X	S.Sol 140, Benzene, Tol, Xyl, 1,2-DCE, PCE, EAK
A-40	Q	X	X	X	X			S.Sol 140, Benzene, Tol, Xyl, 1,2-DCE, PCE
A-41	Q	X	X	X	X	X	X	S.Sol 140, Benzene, Tol, Xyl, 1,2-DCE, PCE
A-42	(dry) Q	X	X	X				
A-43	BM	X	X	X				
A-44		X	X					
A-45	Q	X	X		X		X	
A-46	(dry)							
A-47	(dry)							
A-48	BM	X	X	X				
A-49	(dry)							
A-50	(dry)							
A-51	(dry)							
A-52	BM	X	X	X	X	X	X	PCE
A-53	Q	X	X	X				
A-54	BM	X	X	X				
A-55	BM	X	X	X				
A-56	BM	X	X	X				

TABLE 4 - Chemical Analyses Schedule for Ground-Water Samples (continued)

Well No.	Frequency	Fre 113	ICA	ICE	1,1,1-DCE	1,1-DCA	Chloro	Other
A-57	BM	X	X	X				
A-58	(dry)							
A-59	(dry)							
A-60	(dry)	X	X	X			X	Abandoned
A-61	Q							
A-62	--							
A-63	Q	X	X	X				
A-64	Q	X	X	X				
A-65	Q	X	X	X				
A-66	BM	X	X	X				
A-68	(dry)	X	X	X				
A-69	Q	X	X	X			X	PCE, S.Sol 140, Benzene, Tol, Xyl, Cr, Cr+6
A-70	Q	X	X	X				PCE, S.Sol 140, Benzene, Tol, Xyl
A-71	BM	X	X	X		X	X	S.Sol 140, Benzene, Tol, Xyl
A-72	BM							
A-73	Q	X	X					
A-74	(dry)							
A-75	Q	X	X	X				
A-76	(dry)							
B-1	--							
B-2	BM	X	X	X				
B-3	BM	X	X	X				
B-4	BM	X	X	X				
B-5	BM	X	X	X				
B-6	Q	X	X	X				
B-7	SA	X	X	X				
B-8	SA	X	X	X				
B-9	Q	X	X	X				
B-10	Q	X	X	X				
B-11	Q	X	X	X				
B-12	Q	X	X	X				
B-13	Q	X	X	X				

TABLE 4 - CHEMICAL ANALYSES SCHEDULE FOR GROUND-WATER SAMPLES (CONTINUED)

Well No.	Frequency	Fre 113	ICA	ICE	1,1-DCE	1,1-DCA	Chloro	Other
B-14	Q	X	X		X			
B-15	Q	X	X	X				
B-16	BM	X	X	X	X			
B-17	BM	X	X	X				
B-18	BM	X	X	X				
B-19	BM	X	X	X				
B-20	BM	X	X	X				
B-21	Q	X	X	X	X			
B-22	Q	X	X	X	X			
B-23	SA	X	X	X				
B-24	(dry)		X		X			
B-25	SA							
B-26	(dry)							
B-27	(dry)	X			X			
B-28	Q	X	X		X			
B-29	Q	X	X		X			
B-30	Q	X	X	X				
B-31	Q	X	X	X				
B-32	BM	X	X					
B-33	Q	X	X	X				
B-34	Q	X	X	X				
B-35	Q	X	X	X	X			
B-36	Q	X	X	X				
B-37	Q	X	X	X				
B-38	SA	X	X		X			S.Sol 140, Benzene, Tol, Xyl
B-39	Q	X	X		X			S.Sol 140, Benzene, Tol, Xyl
B-40	Q	X	X		X			
B-41	Q	X	X	X	X			
BC-07	BM	X	X		X			
BC-08	BM	X	X		X			
C-1	BM	X	X					
C-2	BM	X	X	X				
C-3	BM	X	X	X				
C-4	Q	X	X	X				

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TABLE 4 - CHEMICAL ANALYSES SCHEDULE, FOR GROUND-WATER SAMPLES (CONTINUED)

Well No.	Frequency	Fre 113	ICA	ICE	1,1-DCE	1,1-DCA	Chloro	Other	
C-5	BM	X	X	X					
C-6	BM	X	X	X					
C-7	BM	X	X	X					
C-9	BM	X	X	X					
C-11	Q	X	X	X					
C-12	BM	X	X	X					
C-13	BM	X	X	X					
C-14	Q	X	X	X					
C-15	Q	X	X	X					
C-16	SA	X	X						
C-17	SA	X	X	X					
C-18	BM	X	X						
D-1	BM	X	X	X					
D-2	BM	X	X	X					
MD-1-299	BM	X	X	X					
RA-1	BM	X	X	X					
RA-4	(dry)								
RA-5	Q	X	X	X					
RA-7	Q	X	X	X					
RA-8	Q	X	X	X					
RA-9	Q	X	X	X					
RA-11	Q	X	X	X					
RA-12	Q	X	X	X					
RA-13	BM	X	X	X					
RA-14	Q	X	X	X					
RA-15	BM	X	X	X					
RA-16	BM	X	X	X					
RA-17	BM	X	X	X					
RA-18	BM	X	X	X					
RA-19	--	X	X	X					
RA-20	--	X	X	X					

Cr, Cr+6
Cr, Cr+6
MC
Cr, Cr+6
PCE

PCE
S.Sol 140, Benzene, Tol, Xyl
S.Sol 140, Benzene, Tol, Xyl
S.Sol 140, Benzene, Tol, Xyl
S.Sol 140, Benzene, Tol, Xyl
S.Sol 140, Benzene, Tol, Xyl
Redundant to 0-104 (will not be sampled)
Redundant to 0-101 (will not be sampled)

TABLE 4 - CHEMICAL ANALYSES SCHEDULE FOR GROUND-WATER SAMPLES (CONTINUED)

Well No.	Frequency	Fre 113	ICA	ICE	1,1-DCE	1,1-DCA	Chloro	Other
RA-21	BM							S.Sol 140, Benzene, Tol, Xyl
RB-1	Q	X	X	X	X			
RB-4	Q	X	X		X			
RB-5	Q	X	X		X			
RB-6	BM	X	X	X	X			
RC-01	Q	X	X					
ON-SITE OBSERVATION WELLS								
0-12	BM							
0-26	Q	X	X	X	X		X	S.Sol 140, Benzene, Tol, Xyl
0-34	BM							
0-100	BM							
0-101	BM							S.Sol 140, Benzene, Tol, Xyl
0-102	BM							S.Sol 140, Benzene, Tol, Xyl
0-104	BM							S.Sol 140, Benzene, Tol, Xyl
0-105	BM							S.Sol 140, Benzene, Tol, Xyl
0-106	BM							S.Sol 140, Benzene, Tol, Xyl
0-107	BM		X	X				S.Sol 140, Benzene, Tol, Xyl, PCE
0-113	BM							S.Sol 140, Benzene, Tol, Xyl
0-114	BM							S.Sol 140, Benzene, Tol, Xyl
0-115	BM							S.Sol 140, Benzene, Tol, Xyl
0-116	BM							S.Sol 140, Benzene, Tol, Xyl
0-117	BM							S.Sol 140, Benzene, Tol, Xyl
0-118	BM	X	X	X	X		X	S.Sol 140, Benzene, Tol, Xyl, PCE, Isoph, Cr, Cr+6

TABLE 4 - CHEMICAL ANALYSES SCHEDULE FOR GROUND-WATER SAMPLES (CONTINUED)

Well No.	Frequency	Fre 113	ICA	ICE	1,1-DCE	1,1-DCA	Chloro	Other
OFF-SITE OBSERVATION WELLS								
0-110	BM							S.Sol 140, Benzene, Tol, Xyl
0-111	BM							S.Sol 140, Benzene, Tol, Xyl
0-112	BM							S.Sol 140, Benzene, Tol, Xyl
OFF-SITE MONITORING WELLS								
01-B	BM	X	X	X				
01-C	BM	X	X					
01-DJ*	M	X	X					
01-DL*	M	X	X					
02-A	SA	X	X					
02-B	BM	X	X					
02-C	BM	X	X					
02-D	BM	X	X					
03-B	BM	X	X					
03-C	BM	X	X					
04-A	SA	X	X					
04-C	Q	X	X					
05-A	SA	X	X					
05-B	BM	X	X					
05-C	BM	X	X					
06-B	SA	X	X					
06-C	SA	X	X					
07-A	SA	X	X					
07-BU	Q	X	X					
07-BL	Q	X	X					
07-C	Q	X	X					
08-A	SA	X	X					
08-CU	BM	X	X					
08-CL	BM	X	X					
09-A	SA	X	X					

*Compliance point well (RWQCB, 1988)

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TABLE 4 - Chemical Analyses Schedule for Ground-Water Samples (continued)

Well No.	Frequency	Fre 113	ICA	ICE	1,1-DCE	1,1-DCA	Chloro	Other
09-B	BM	X	X		X			
09-C	BM	X	X		X			
09-D*	M	X	X		X			
09-MD-186*	M	X	X		X			
10-A	SA	X	X		X			
10-B	Q	X	X		X			
10-C	SA	X	X		X			
10-D	SA	X	X		X			
11-BC	SA	X	X		X			
12-A	BM	X	X	X	X		X	
13-A	SA	X	X		X			
13-B	BM	X	X		X			
13-C	BM	X	X		X			
13-D	BM	X	X		X			
14-B	SA	X	X		X			
14-C	SA	X	X		X			
15-B	Q	X	X		X			
15-C	Q	X	X		X			
16-B	SA	X	X		X			
16-C	SA	X	X		X			
17-B	SA	X	X		X			
17-C	SA	X	X		X			
18-B	Q	X	X		X			
18-C	Q	X	X		X			
19-BU	BM	X	X		X			
19-BL	BM	X	X		X			
19-C	BM	X	X		X			
20-B	Q	X	X		X			
20-C	Q	X	X		X			
21-C	SA	X	X		X			
22-B	SA	X	X		X			
22-C	SA	X	X		X			
23-A	SA	X	X		X			

*Compliance point well (RMQCB, 1988)

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TABLE 4 - Chemical Analyses Schedule for Ground-Water Samples (continued)

Well No.	Frequency	Fre 113	ICA	ICE	1,1-DCE	1,1-DCA	Chloro	Other
23-B	Q	X	X		X			
23-C	Q	X	X		X			
24-B	Q	X	X		X			
24-C	Q	X	X		X			
25-B	SA	X	X		X			
25-C	SA	X	X		X			
26-B	SA	X	X		X			
26-C	SA	X	X		X			
27-B	SA	X	X		X			
27-C	SA	X	X		X			
28-B	SA	X	X		X			
28-C	SA	X	X		X			
29-B	Q	X	X		X			
29-C	Q	X	X		X			
30-BC	Q	X	X		X			
31-BC	Q	X	X		X			
32-B*	BW/M	X	X		X			
32-C*	BW/M	X	X		X			
33-BC*	BW/M	X	X		X			
34-BC*	BW/M	X	X		X			
35-BC*	BW/M	X	X		X			
36-BCD*	BW/M	X	X		X			
37-BC*	BW/M	X	X		X			
38-BC*	BW/M	X	X		X			
38-D	M	X	X		X			
39-BC*	BW/M	X	X		X			
39-D	M	X	X		X			
40-BC*	BW/M	X	X		X			
41-B	SA	X	X		X			
42-B	SA	X	X		X			
43-MD-181	Q	X	X		X			
44-BC*	BW/M	X	X		X			
44-D	M	X	X		X			

*Compliance point well (RWQCB, 1988)

TABLE 4 - Chemical Analyses Schedule for Ground-Water Samples (continued)

Well No.	Frequency	Fre 113	ICA	ICE	1,1-DCE	1,1-DCA	Chloro	Other
45-BC	M	X	X		X			
46-BC	M	X	X		X			
47-D*	BW/M	X	X		X			
48-MD-260	BM	X	X		X			
ORC-1	M	X	X		X			
ORBC-2	M	X	X		X			
ON-SITE EXTRACTION WELLS								
RA-2	BW/M	X	X	X	X	X	X	1,2-DCE, PCE
RA-3	(dry)							
RA-6	(dry)							
RA-10	(dry)							
RB-2	BW/M	X	X	X	X			
RB-3	BW/M	X	X	X	X			
OFF-SITE EXTRACTION WELLS								
ORB-1	M	X	X		X			
ORBC-3	M	X	X		X			
PUBLIC/PRIVATE WELLS								
03	Q	X	X	X	X			
09	Q	X	X		X			
35	Q	X	X		X			
37	Q	X	X		X			
58	Q	X	X		X			
61	Q	X	X		X			
62	Q	X	X		X			
63	Q	X	X		X			
64	Q	X	X		X			
65	Q	X	X		X			
69	Q	X	X		X			

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TABLE 4 - CHEMICAL ANALYSES SCHEDULE FOR GROUND-WATER SAMPLING (CONTINUED)

Well No.	Frequency	Fre 113	ICA	ICE	1,1-DCE	1,1-DCA	Chloro	Other
70	Q	X	X		X			
71	Q	X	X		X			
72	Q	X	X		X			
73	Q	X	X		X			
77	Q	X	X		X			
78	Q	X	X		X			
PRODUCTION WELLS (ON-SITE)								
W-3	Q	X	X		X			S.Sol 140, Benzene, Tol, Xyl
W-4	Q	X	X		X			S.Sol 140, Benzene, Tol, Xyl
W-5	Q	X	X		X			S.Sol 140, Benzene, Tol, Xyl
W-6	Q	X	X		X			S.Sol 140, Benzene, Tol, Xyl
W-7	Q	X	X		X			S.Sol 140, Benzene, Tol, Xyl
W-8	Q	X	X		X			S.Sol 140, Benzene, Tol, Xyl
IRRIGATION WELLS (ON-SITE)								
1-009	--							Abandoned
Boyce	--							Abandoned
Chris	Q	X	X		X			
CH-H	Q	X	X		X			
Henley	Q	X	X		X			
Felice	Q	X	X		X			
Lodge	Q							
Mabee	--	X	X		X			Abandoned
NBoyce	Q	X	X		X			
Rubino	Q	X	X		X			
Swick	Q	X	X		X			
Waltc	Q							Abandoned
Yosh	--	X	X		X			

EXPLANATION FOR TABLE 4

1. Abbreviations for frequencies are:

W Weekly
 BW Biweekly (every 2 weeks)
 BM Bimonthly (every 2 months)
 M Monthly
 Q Quarterly
 SA Semiannually (2 times per year)
 Dry Well cannot be sampled due to low water level
 BW/M BIWEEKLY SAMPLING UNTIL JULY 1989, THEREAFTER MONTHLY SAMPLING

2. Abbreviations for chemicals are:

<u>Abbreviation</u>	<u>Chemical</u>
Fre 113	Freon 113 (1,1,1,2-trichloro-1,2,2,2-trifluoroethane)
TCA	1,1,1-trichloroethane
TCE	Trichloroethylene
1,1-DCE	1,1-dichloroethylene
1,1-DCA	1,1-dichloroethane
Chloro	Chloroform
1,2-DCE	1,2-dichloroethylene
PCE	Perchloroethylene
Pet Nap	Petroleum Naphtha
S.Sol 140	Shell Sol 140
Tol	Toluene
Xyl	Xylenes
EAK	Ethyl Amyl Ketone
MC	Methylene Chloride
Isoph	Isophorone
Cr	Chromium
Cr+6	Hexavalent chromium